

METHOD AND STRUCTURE FOR REDUCTION OF CONTACT
RESISTANCE METAL SILICIDES USING A
METAL-GERMANIUM ALLOY

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ABSTRACT OF THE DISCLOSURE

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A method of reducing the contact resistance of metal silicides to the p+ silicon area or the n+ silicon area of the substrate comprising: (a) forming a metal germanium (Ge) layer over a silicon-containing substrate, wherein said metal is selected from the group consisting of Co, Ti, Ni and mixtures thereof; (b) optionally forming an oxygen barrier layer over said metal germanium layer; (c) annealing said metal germanium layer at a temperature which is effective in converting at least a portion thereof into a substantially non-etchable metal silicide layer, while forming a Si-Ge interlayer between said silicon-containing substrate and said substantially non-etchable metal silicide layer; and (d) removing said optional oxygen barrier layer and any remaining alloy layer. When a Co or Ti alloy is employed, e.g., Co-Ge or Ti-Ge, two annealing steps are required to provide the lowest resistance phase of those metals, whereas, when Ni is employed, a single annealing step forms the lowest resistance phase of Ni silicide.